

CLAIMS

What is claimed is:

1 1. A modular switch comprising:
2 fiber and power access ports for receiving and
3 distributing physical signal and power connection media;
4 dual switch fabric modules coupled to transmit signals
5 to and receive from subscriber service modules and
6 including a first switch fabric module and a second switch
7 fabric module;
8 dual optical trunking modules coupled to transport
9 switched signals between the dual switch fabric modules and
10 a service provider optical network, the optical trunking
11 modules providing optical transport distance and redundancy
12 and include a first trunking module and a second trunking
13 module; and
14 at least one service signal port coupled to the dual
15 optical trunking modules, via the dual switch fabric
16 modules, to transmit and receive signals and provide access
17 to a subscriber.

1 2. The modular switch of claim 1 wherein the dual optical
2 trunking modules each comprise one or more 1 gigabit
3 Ethernet trunk optic cards or one or more 10 gigabit
4 Ethernet optics cards.

1 3. The modular switch of claim 1 wherein the dual switch
2 fabric modules each comprise 32 Gbps or higher switch
3 fabrics.

1 4. The modular switch of claim 1 wherein the switch
2 fabric modules
3 support at least one of ethernet switching, Internet
4 Protocol routing, Multiprotocol Label Switching, and
5 Resilient Packet Ring.

1 5. The modular switch of claim 1 further comprising an
2 environmentally hardened outdoor housing.

1 6. The modular switch of claim 1 wherein the dual optical
2 trunking modules, the dual switch fabric modules, and other
3 component parts of the modular switch, including subscriber
4 service modules and power supplies, comprise
5 environmentally hardened optical and electrical components.

1 7. The modular switch of claim 6 wherein the optical and
2 electrical components have an operating temperature range
3 of about -40 degrees Celsius to 60 degrees Celsius.

1 8. The modular switch of claim 1 further comprising at
2 least one subscriber service module and a plurality of
3 subscriber service module slots, the at least one
4 subscriber service module interfacing between one or more
5 subscriber end points and the dual switch fabric modules
6 and comprising at least one subscriber signal port, each
7 subscriber service module slot configured to receive one of
8 the at least one subscriber service module.

1 9. The modular switch of claim 8 further comprising a
2 plurality of subscriber service modules, with each
3 subscriber service module slot receiving a different

4 subscriber service module.

1 10. The modular switch of claim 8 further comprising a
2 plurality of subscriber service modules wherein the
3 subscriber service modules collectively provide access to
4 ninety-six homes.

1 11. The modular switch of claim 1 further comprising a
2 subscriber service module wherein the subscriber service
3 module is coupled to one or both of the dual optical
4 trunking modules, via one or both of the dual switch fabric
5 modules, providing network connectivity for subscriber
6 signal ports contained in the subscriber service module .

1 12. The modular switch of claim 11 wherein the subscriber
2 service module comprises multiple single mode, single
3 fiber, environmentally hardened optical transceivers
4 serving as subscriber signal ports.

1 13. The modular switch of claim 1 wherein the first
2 optical trunking module transports signals in one direction
3 and the second optical trunking module transports signals
4 in a different direction, each optical trunking module
5 using one or more fibers.

1 14. The modular switch of claim 13 wherein the optical
2 trunk connections comprise one of a layer 2 link
3 aggregation and a layer 3 link aggregation to enable both
4 route and equipment protection.

1 15. The modular switch of claim 13 wherein the fiber

2 access ports used by the dual optical trunking modules
3 receive signals from and transmit signals to a ring network
4 architecture.

1 16. The modular switch of claim 1 wherein the subscriber
2 access comprises a point to point connection.

1 17. The modular switch of claim 1 wherein the dual switch
2 fabric modules are coupled to transmit signals to and
3 receive signals from at least one of the dual optical
4 trunking modules, the dual switch fabric modules further
5 providing at least one of signal switching, routing,
6 traffic aggregation, and redundancy.

1 18. An optical network comprising:
2 a network transmitting a signal;
3 a router coupled to the network to route the signal;
4 an environmentally hardened modular switch coupled to
5 the router and subscriber end points, the modular switch
6 receiving signals from the router and the subscriber end
7 points to provide point to point subscriber access; and
8 a fiber access box at a destination coupled to the
9 modular switch with the fiber access box receiving signals
10 from and transmitting signals to the modular switch;
11 wherein the modular switch comprises dual optical
12 trunking modules, dual switch fabric modules, and a
13 plurality of subscriber service modules, the dual optical
14 trunking modules coupled to at least one of the dual switch
15 fabric modules and the dual switch fabric modules coupled
16 to the subscriber service modules.

1 19. The optical network of claim 18 wherein the modular
2 switch performs at least one of fully redundant switching,
3 aggregation, quality of service classification, and signal
4 transport between the subscriber and the service provider
5 network.

1 20. The optical network of claim 18 wherein the network,
2 the router, and the modular switch are coupled through ring
3 architectures.

1 21. The optical network of claim 18 further comprising one
2 or more pedestals coupled between the modular switch and
3 the fiber access box, the pedestal providing a fiber
4 breakout point coupling the fiber access box to the modular
5 switch.

1 22. The optical network of claim 18 further comprising a
2 fiber distribution device coupled to the modular switch
3 wherein the pedestal provides a fiber breakout point
4 coupling the fiber access box to the modular switch through
5 the fiber distribution device.

1 23. The optical network of claim 18 wherein the fiber
2 access box comprises an optical to electrical conversion
3 unit.

1 24. The optical network of claim 18 wherein the fiber
2 access box comprises a voice over Internet protocol media
3 gateway.

1 25. The optical network of claim 18 further comprising

2 intelligent home networking equipment coupled to the fiber
3 access box, the home networking equipment located within a
4 subscriber premise.

1 26. The optical network of claim 18 wherein the fiber
2 access box comprises a plurality of fiber access boxes.

1 27. The optical network of claim 18 further comprising an
2 environmentally hardened fiber splice cabinet coupled
3 between the modular switch and one or more fiber access
4 boxes, the fiber splice cabinet providing a fiber splice
5 point between subscriber optical service cables and
6 multiple fiber trunk cables used for connecting fiber
7 access boxes to the modular switch, the subscriber optical
8 service cables mating with subscriber service ports on the
9 subscriber service modules.

1 28. The optical network of claim 27 wherein the
2 environmentally hardened fiber splice cabinet includes
3 multiple fiber access ports for one or more fiber trunk
4 cables and one or more subscriber service cables.

1 29. The optical network of claim 27 wherein the fiber
2 access ports of the environmentally hardened fiber splice
3 cabinet comprise one or more fiber access ports
4 accommodating one of one 96 fiber cable, two 48 fiber
5 cables, four 24 fiber cables, eight 12 fiber cables, and
6 one 72 fiber cable plus one 24 fiber cable.

1 30. The optical network of claim 18 wherein the router
2 comprises an internet protocol router.

1 31. A method of providing a signal to a destination

2 comprising:

3 receiving a signal in one of two optical trunking
4 modules;

5 transmitting the received signal to one or both dual
6 switch fabric modules;

7 switching and aggregating the received signal;

8 providing quality of service for the switched signal;

9 transmitting the switched signal to one of several
10 subscriber service ports contained on subscriber service
11 modules; and

12 transmitting the switched signal from the one of the
13 several subscriber service ports to a subscriber fiber
14 access box of a destination.

1 32. The method of claim 31 further comprising receiving
2 the signal from a network and routing the signal to the
3 switch.

1 33. The method of claim 31 further comprising converting
2 the signal from an optical signal to an electrical signal
3 in the subscriber fiber access box.

1 34. The method of claim 31 wherein transmitting the
2 switched signal from the one of the several subscriber
3 service ports to the subscriber fiber access box is
4 comprises transmitting the switched signal to the
5 subscriber fiber access box through an optical splice
6 cabinet and a fiber breakout point housed in a pedestal.

1 35. The method of claim 34 wherein transmitting the
2 switched signal through the pedestal to the subscriber
3 fiber access box comprises transmitting the switched signal
4 through the pedestal to one of a plurality of subscriber
5 fiber access boxes.

1 36. The method of claim 34 wherein transmitting the
2 switched signal through the pedestal to the subscriber
3 fiber access box comprises transmitting the switched signal
4 through one or more pedestals to one or more subscriber
5 fiber access boxes.